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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,681	02/28/2007	Dieter Meier	WP22694US 7404-740	3817

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EXAMINER	
HORNING, JOEL G	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/552,681	MEIER ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10-10-2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed 10-10-2005 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Objections

1. **Claim 13** is objected to because of the following informalities: the claim recites "depositng" instead of "depositing." Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 12-25** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding **claim 12**, applicant has claimed that the non-conductive layer is "adjacent" to the metallic layer while an "intermediate layer" is present. Where an

intermediate layer is present, the disclosure only teaches the situation where the dielectric layer **14** is separated from the metallic layer **12** by the intermediate layer **13**, (see figure 2), thus the dielectric layer is not taught to be adjacent to the metallic layer when the intermediate layer is present.

Regarding **claims 15 and 16**, applicant has claimed that the laser energy includes and ion beam or an electron beam respectively. The disclosure teaches the possibility of using an ion beam or an electron beam in order to selectively remove material (page 6, paragraph 5), but does not teach either one in the form of laser energy.

Claims 13-25 are rejected for being dependent upon a rejected claim (claim 12).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 12-25** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "said intermediate layer" in line 6. There is insufficient antecedent basis for this limitation in the claim.

As a result one of ordinary skill in the art would no know where this layer is or what the corresponding portions of the conductive or non-conductive layers are. For the purpose of examination, it will be assumed that the “intermediate layer” is positioned between the non-conductive layer and the metallic layer and thus the

"intermediate" to these two layers. The portions of the conductive and non-conductive layers that are directly in contact to the portion of the intermediate layer which is ablated will be considered the "corresponding" portions of those layers.

Claim 12 further recites that the non-conductive layer and the metallic layer are "adjacent" to each other, but there is an "intermediate layer between them.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "adjacent" in claim 12 is used by the claim to mean that adjacent layers can be separated by at least an intermediate layer, while the accepted meaning is "directly next to each other," which would exclude the possibility of an intermediate layer. The term is indefinite because the specification does not clearly redefine the term. For the purposes of examination, "adjacent" will be interpreted to include structures where the layers are separated by one or more intermediate layers.

Claim 12 is further rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the deposition of an intermediate layer. Since a portion of the intermediate layer is removed, it must

have been deposited onto the substrate. For the purpose of examination it will be assumed that an intermediate layer is deposited.

Claims 13-25 are rejected for being dependent upon the rejected claim 12.

Claims 15 and 16 further recite that an ion beam and an electron beam are included in a "laser energy."

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term “laser energy” in claims 15 and 16 is used by the claims to include energy in the form of an ion beam or an electron beam, while the accepted meaning is “energy from a light amplification by stimulated emission of radiation (LASER) process” which would necessarily be light energy and specifically would exclude energy from ion or electron beams. The term is indefinite because the specification does not clearly redefine the term. For the purposes of examination, “laser energy” will be interpreted to just mean “energy,” which would allow the inclusion of ion and electron beams.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 12, 13, 15, 17, 19, 23 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al (US 5302547) in view of Lee et al (US 2002/0121692).

The claims are directed towards a method for manufacturing a test sensor comprising forming a multiple layer device by forming a multilayer device which includes:

a. Depositing a metallic layer onto a substrate material by physical vapor deposition;

b. Depositing an intermediate layer;

c. Depositing an electrically non-conductive layer “adjacent” to the metallic layer by plasma enhanced chemical vapor deposition;

d. Selectively removing a portion of the intermediate layer and a corresponding portion of either said metallic layer or said non-conductive layer by applying energy.

Wojnarowski et al is directed towards a manufacturing method for patterning polymer layers in a multiple layer electronic device (abstract), such as circuit interconnect devices (col 1, lines 8-10), which sense electrical potentials placed on their metal traces by sending an electrical signal, which can be read, thus they can be considered "test sensor" devices. As shown in figures 3a-d, the method comprises supplying a substrate **10** with a metallic layer (chip pad) **17** deposited on it, onto which an intermediate bilayer **18** and **20** is deposited, onto which a hard mask layer of Silicon Nitride (a dielectric material, which is also not intended to conduct electricity: non-conducting layer) **76** is deposited via plasma enhanced CVD (col 7, lines 38-56). A portion of the intermediate layer (along with the corresponding portion of the non-conductive layer, **claim 24**) is then removed by applying laser energy to the intermediate layer (col 7, lines 57-63). Wojnarowski et al does not teach how the contact pad **17** is formed.

However, Lee et al teaches that metal contact pads are conventionally formed by sputtering methods (a physical vapor deposition process) [0072].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit the contact pads by physical vapor deposition (sputtering) since it was known to the art to be the conventional method of depositing such pads and would produce predictable results **(claims 12 and 13)**.

5. Regarding **claim 15**, Wojnarowski et al teaches further removal of the intermediate layer by using an ion beam (reactive ion etch, which uses a beam of ions) (col 7, lines 64-67 which directs to col 5, lines 42-43).

6. Regarding **claim 17**, Wojnarowski et al teaches that the metal contact can be aluminum (col 6, lines 36-40).
7. Regarding **claim 19**, Wojnarowski et al teaches making the intermediate layer of polytetrafluoroethylene, either with an additional Kapton layer (col 5, lines 54-55) or by itself (col 8 line 65 through col 9, line 3).
8. Regarding **claim 23**, Wojnarowski et al teaches depositing additional metallic layers (col 8, lines 16-17).
9. **Claims 14, 16 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al (US 5302547) in view of Lee et al (US 2002/0121692) further in view of Janai et al (US 6255718).

As discussed previously, Wojnarowski et al in view of Lee et al teaches depositing a layered structure with a polymer intermediate layer (e.g. fluoropolymers like PTFE) over the metal contacts and then patterning it by laser ablation. It further teaches depositing the polymer intermediate layer in the form of a liquid or a laminate (col 5, lines 14-26), but it does not teach depositing them by PECVD.

However, Janai et al is also directed towards the deposition of polymer layers and then patterning those polymer layers through laser ablation in order to create electronic devices (abstract). Since the polymer layer can be built of fluorocarbon monomers, it also teaches forming these polymer layers as fluoropolymers (col 4, lines 20-21). It further teaches that it is known to deposit these polymer layers by other methods such as liquid deposition methods, but that most polymers deposited this way are transparent to visible light and thus require expensive and less efficient

UV lasers in order to ablate them (col 2, lines 23-32). In order to overcome this, it teaches depositing the polymer layers by a PECVD process, which can then allow the polymers to be ablated by visible light lasers (col 3, lines 19-34), they further teach that by modifying the polymer deposition process, the laser absorption of the polymer layers can be tailored for any chosen lasers wavelength (col 7, lines 21-26).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit the fluoropolymer intermediate layers of Wojnarowski et al in view of Lee et al by the PECVD process of Janai et al in order to be able to ablate the polymer layers with less expensive visible light lasers and to be able to tailor the absorption of the polymer to match available lasers instead of buying a laser of the proper frequency for different polymeric materials **(claim 20)**.

10. Regarding **claim 14**, Wojnarowski et al in view of Lee et al, does not teach what energy densities are required to ablate their polymer intermediate layers, however, Janai et al teaches ablating the polymer layers with a relatively small amount of laser energy (col 1, lines 42-45) and teaches that its plasma deposited polymers can be ablated at energy densities less than $4J/cm^2$, which overlaps with applicant's claimed range (col 5, lines 62-64).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use the energy densities taught by Janai et al to ablate the plasma deposited polymer intermediate layers, since they are taught to be suitable for those layers.

MPEP 2144.05 states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists."

11. Regarding **claim 16**, Wojnarowski et al in view of Lee et al does not teach if their polymer intermediate layers can be ablated by electron beams, but Janai et al teaches that plasma deposited polymers can be ablated by electron beams (col 4, lines 24).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to ablate some of the polymer intermediate layer material though electron beams since it was known to be a suitable method for ablating such plasma deposited polymer layers and would produce predictable results.

12. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al (US 5302547) in view of Lee et al (US 2002/0121692) further in view of Trapp et al (US 2002/0192976).

As previously discussed, Wojnarowski et al in view of Lee et al teaches the deposition of an electrically non-conductive SiN layer as an etching masking layer, but it does not teach how thick the layer should be.

However, Trapp et al is also directed towards the formation of etching mask layers and teaches that the thickness of masking layers should be adjusted so that it is thick enough to prevent undesired etching of the substrate, yet thin enough not to hinder the etching process for the desired feature size [0050]. Put another way the thickness of the non-conductive layer is a result effective variable for avoiding undesired etching conditions.

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "a thickness less than or substantially equal to 1 micon" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

13. **Claims 21 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al (US 5302547) in view of Lee et al (US 2002/0121692) further in view of Young (US 2002/0139981).

Wojnarowski et al in view of Lee et al teaches that the "substrate **10** may comprise any structural material" (col 4, lines 65-66), which would include using a polymeric or flexible material, but it does not specifically teach doing so.

However, Young is also directed towards the formation of electrical devices (which include interconnect devices) and it teaches that flexible polymer substrates (such as polyimide [0024]) are desirable substrates for the formation of semiconductor circuit elements since they are flexible, which means they can be used to make curved devices or rolled up to save space or so the device can be formed into other aesthetically pleasing shapes [0002].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a flexible polymer substrate as the substrate in the process of Wojnarowski et al in order to be able to produce non-planar electrical devices for

aesthetic or design reasons or to have a devices which can be rolled up in order to save space **(claims 21 and 22)**.

14. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al (US 5302547) in view of Lee et al (US 2002/0121692) further in view of Young (US 2002/0139981) further view of Polak (US 4382101).

Wojnarowski et al in view of Lee et al further in view of Young et al does not teach plasma treating the polymer substrate before depositing the metal layer.

However, Polak is also directed to metal clad polymers (for example, polyimide, column 1, lines 60-65) and teaches that by plasma treating (a plasma activation process) polymer substrates before depositing the metal, the peel strength of the metal layer can be increased (abstract).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to perform a plasma activation (plasma treatment) on the polymeric substrate (such as the polyimide taught by Young and Polak) before depositing the metal layer in order to increase the peel strength of the metal layer and thus have a more robust structure.

Conclusion

15. No current claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792